PATENT SPECIFICATION

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(19)

(54) METHOD OF PREPARING ANIMAL FOODS

(71) We, GENERAL FOODS CORPORATION, a Corporation organized under the laws of the State of Delaware, United States of America, of 250 North Street, White Plains, State of New York, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to animal foods, and, more particularly, to animal foods having increased palatability and method for producing the same.

There is a continuing effort being made to develop processes and formulations which increase the palatability of animal foods while at the same time maintaining their nutritional value. While the development and production of nutritious animal foods has posed few problems to the art, there is a continuing problem of making these formulations palatable. Where the foods are unpalatable, animals often pass up the offered foods and do not take advantage of their nutritional value.

Accordingly, there is a need for an animal food of improved palatability and a process for improving the palatability of animal food.

According to the invention there is incorporated a fat which has been subjected to a lipase or a mixture of a fat and protein which mixture has been subjected to an enzyme mixture of lipase and protease.

Animal foods normally contain from about 4 to 16 weight per cent fat. Any portion or all of this fat content, can be conditioned, it being necessary to the present invention only to provide an effective amount of the conditioned fat or mixture of fat and protein for increasing the palatability of the animal food. When a mixture of fat and protein is to be used the mixture can be conditioned separately, or any portion of the total animal food composition comprising both fat and protein can be subjected to the action of the enzyme mixture if desired. The fat is preferably lipolyzed separately, however, the total animal food composition can be subjected to the action of lipase if desired.

The enzyme-conditioned fat or fat protein mixture can be incorporated into the animal food in any suitable manner. Thus, where the complete animal food or a portion thereof is conditioned, the conditioned fat or fat and protein mixture is incorporated by producing it *in situ*. Or, the conditioned fat or fat and protein mixture can be prepared separately from the remainder of the animal food and then mixed with or applied to the animal food. These procedures will be discussed in more detail below.

The fats employed alone or in the mixture comprising fat and protein are preferably animal fats such as those naturally present in meats bleachable fancy tallow (a high quality product obtained from animal tissues comprising glyceride esters of fatty acids), chicken fat, butter oil and lard. While other fats can be employed, butter fat and bleachable fancy tallow are preferred. It will be apparent to those skilled in the art that certain fats and oils such as cocoa butter, which naturally or after conditioning, are unpalatable to animals, are not preferred according to the present invention.

The protein employed in the mixture comprising fat and protein can be any of those available in quantity at a reasonable cost. Where an emulsifier is added to the reaction mixture, it is preferable to employ a proteinaceous emulsifier which both supplies the protein and effects emulsification. Also, a meat slurry or other proteinaceous ingredient of the animal food may supply the necessary protein.

The process for conditioning the fat or mixture of fat and protein broadly comprises emulsifying the fat or mixture and treating the fat or mixture with an enzyme which is lipase (for fat alone) or a mixture comprising lipase and protease for fat and protein. The reaction between the emulsified fat-protein mixture and the enzyme mixture is presently believed to produce a complex array of reaction products. The fat reacts with the lipase to produce free fatty acids and mono- and diglycerides. The protein reacts with the protease to produce polypeptides and free amino acids. It is further possible that other reactions occur. The exact reactions and reaction products responsible for the unexpected improvement in the

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palatability of animal foods which is effected by the present invention are not presently identifiable. However, the reaction between the emulsified fat-protein mixture and the enzyme mixture produces a real and reproducible improvement, and applicants do not wish to be bound to any specific theory as to which particular reaction or reaction product brings about the desired result of the present invention.

In the reaction of fat with lipase, while lipase from most sources, such as microbially derived and pancreatic lipases, can be employed according to the present invention, pancreatic lipase is preferred. And, while the particular concentration of lipase is not presently believed critical, usual commercial lipases are typically employed in amounts of from 0.05 to 1.0% based on the weight of the fat.

The reaction between the lipase and the fat is heterogeneous. It is necessary, therefore, as a practical matter, to emulsify the fat to provide small droplets of fat suspended in a continuous aqueous phase containing the lipase. While it may be possible to maintain a dispersion of fat droplets within the water phase by the use of extreme mechanical agitation, the use of an emulsifier such as gum arabic, alginate, "Tween" 80 polyoxyethylene (20) sorbitan monooleate, succinoylated monglycerides, or sodium stearoyl-2-lactylate is preferred. The word "Tween" is a registered Trade Mark. Although the exact concentration of the emulsifier is not presently believed to be critical, it is typically employed in amounts ranging from 0.1 to 20% by weight based on the weight of the fat.

To effect the reaction the fat is preferably melted by heating to a temperature of between 100° and 140°F and admixed with an aqueous solution containing the emulsifier which is maintained at about the same temperature as the fat. This admixture is emulsified by subjecting it to vigorous mixing. The lipase is then dissolved in water at or below about 100°F and added to the emulsified fat. The emulsion may then by re-emulsified. The emulsion is then subjected to constant, efficient stirring for the duration of the reaction. The emulsion may also contain a promoter such as calcium chloride and sodium chloride.

The relative amounts of fat and water present in the emulsion are not presently believed to be critical, but are desirably present at a fat water ratio of from about 1:100 to 10:1, and preferably at a ratio of 1:4 to 1:1.

The reaction is continued for a period of time ranging from 5 minutes to 96 hours. After the desired period of reaction, the emulsion can be heated to an elevated temperature, for example, 70°—95°C, to inactivate the lipase.

Similarly with a fat protein mixture it is presently considered necessary to emulsify the fat before treatment with the enzyme mixture. This is due to the fact that emulsification increases the fat-water interfacial area, thereby facilitating the heterogeneous reaction between the fat and lipase. Emulsification can be obtained through the addition of an emulsifier; or, as in the case where the fat-protein mixture comprises a meat slurry, the meat slurry will impart a limited natural emusifying effect. Where an emulsifier is added, it is preferably proteinaceous. "Promine" D soy isolate is a particularly preferred proteinaceous emulsifier for use according to the present invention. The word "Promine" is a registered Trade Mark. While the exact concentration of the emulsifier is not presently believed critical, it is typically employed in amounts ranging from 0.5% to 20% by weight based on the weight of the fat.

The enzyme mixture comprising lipase and protease employed according to the present invention may be derived from any suitable source as long as it contains effective amounts of both lipase and protease when used at concentrations which will not adversely effect the palatability of the animal food. Preferably the enzyme mixture should contain from 20 to 250 lipase units per gram and from 5000 to 7000 protease units per gram. A lipase unit is defined as that amount of the enzyme which will hydrolyze 0.885 grams of olive oil calculated as triolein to diolein and oleic acid in two hours at 37°C. A protease unit is defined as that amount of the enzyme which will digest 1 mg. of casein in one minute at 50°C at pH 7.5. Pancreatic lipase, which is an enzyme mixture containing about 220 lipase units per gram and about 6000 protease units per gram, is particularly preferred. The exact concentration at which the enzyme mixture is employed is not presently considered critical and it is typically employed in amounts sufficient to supply from 20 to 250 lipase units and 5000 to 7000 protease units per 100 grams fat. The enzyme mixture can be admixed with the reaction mixture at any time before, during or after emulsification. Admixture after emulsification is, however, preferred.

To effect the reaction in the case where the protein comprises a proteinaceous emulsifier the fat is preferably melted, admixed with an aqueous dispersion containing the proteinaceous emulsifier, vigorously agitated to effect emulsification, admixed with the enzyme mixture and maintained at suitable reaction conditions for a period of time sufficient to effect the reaction. The relative amounts of fat and water necessary for the reaction are not presently considered critical, but are desirably present at a fat to water ratio of from about 1:100 to 10:1, and preferably from 1:4 to 1:1. The reaction mixture may also contain a promoter such as calcium chloride and sodium chloride.

It has been found that temperatures within the range of from 35° to 50°C are effective

for both heating the reactants prior to admixture and for maintaining the reaction. This temperature range is therefore preferred. It is noted, however that lower temperatures can be employed with somewhat diminished results due to incomplete emulsification and reduced reaction rates. Also, somewhat higher temperatures can be employed but are generally more costly than the increased reaction rates will justify. The aqueous emulsifier dispersion, which may also contain the promoter, is preferably brought to a boil for about 10 minutes and then reduced to 35°C—50°C for admixture with the fat.

After emulsification, the enzyme mixture is admixed and constant efficient stirring is maintained for the reaction period to maintain a desirably high rate of reaction. The reaction will generally be continued for a period of time ranging from 5 minutes to 16 hours, typically from 15 minutes to two hours.

It has been determined that the pH during reaction has an effect on palatability, with alkaline reaction conditions producing the more preferred results. Preferably, the pH is adjusted periodically to bring it to within the range of from 7 to 9, and most preferably from 8.0 to 8.5.

After the desired period of reaction, the emulsion can be treated to inactivate the enzymes. Typically, it can be heated to an elevated temperature, for example, 70° to 95°C, for a period of time sufficient to inactivate the enzymes, for example 5 to 15 minutes.

The enzyme-conditioned fat-protein mixture is preferably maintained in the emulsified state for incorporation into the animal food. The emulsion can, if desired, be cooled or frozen and stored for extended periods of time.

The enzyme-conditioned fat or fat-protein mixture can be incorporated into the animal food in any suitable manner. Application by spraying is particularly preferred for dry animal foods because it allows uniform surface application without breaking the emulsion. This makes it possible to obtain improved palatability with significantly smaller amounts of the conditioned fat-protein mixture. Typical of a suitable device for spraying the emulsion onto the animal food is a spray gun of the kind commonly employed in spray painting which can apply the coating to a feed material in a rotating drum for example a cement mixer type drum. While the fat to water ratio of the emulsion is not believed to be critical during application of the emulsion to the animal food, it generally ranges from 1:5 to 1:1, and typically about 1:4. Where it is desired that the animal food have an outer coating of an unconditioned fat along with the enzyme conditioned fat-protein mixture, the two materials can be applied sequentially or simultaneously. Preferably, the unconditioned fat is emulsified and applied first, and the enzyme-conditioned fat-protein mixture is applied thereover. The animal food can be dried after incorporation of the enzyme-conditioned fat-protein to reduce the moisture content to the desired level.

The enzyme-conditioned fat or fat-protein mixture prepared in this manner is generally applied in any effective amount it has been found in practice that amounts as low as about 0.1 per cent by weight based on the total weight of the animal food has provided significant improvement in palatability for dogs. Generally, amounts of greater than about 5% by weight based on the total weight of the animal food are not employed unless the animal food so treated is later diluted with another material such as untreated animal food, meat scraps, or water. Preferably lipolyzed fat is employed at a 1% level.

In the case where the fat-protein mixture comprises a proteinaceous ingredient of the animal food, such as a meat slurry, the reaction according to the present invention is preferably effected by heating the slurry to reaction temperature and admixing the enzyme mixture therewith. Constant, efficient stirring is maintained for the duration of the reaction. The natural emulsifying effect of the conventional meat slurrying process may be sufficient to emulsify the fat in the slurry. However, it is preferred to add an emulsifier to obtain a more stable emulsion. The pH, temperature and reaction time for this embodiment are controlled in the same manner as in the embodiment wherein the protein comprises a proteinaceous emulsifier.

This enzyme-treated meat slurry is admixed with the other ingredients of an animal food, such as fat, carbohydrate, protein, vitamins and minerals in any effective amount to provide an animal food of improved palatability. The enzyme-treated meat slurry can generally comprise from 1% to 35%, and preferably from 5% to 30%, of the animal food. As a guideline to an upper limit, it is noted that high concentrations seem to adversely affect the texture of the animal food, and should be avoided where the impairment of the texture outweighs the improvement in palatability.

For intermediate moisture (i.e., soft moist) animal foods, the lipolyzed fat alone is advantageously incorporated by subjecting a portion of the animal food to the action of lipase and then recombining it with the remainder of the animal food.

While the conditioned fats or fat-protein mixture prepared according to the present invention can improve the palatability of animal foods generally, they are especially suitable for use with nutritionally balanced foods comprising protein, fat, carbohydrate, vitamins and minerals. Particularly significant and dramatic increases in palatability have been noted with dry animal foods of the type described in United States Patent 3,365,297

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to H. M. Burgess et al, and intermediate moisture animal foods such as those described in United States Patents 3,482,985 and 3,615,652 to H. M. Burgess et al, and United States Patent 3,623,884 to G. J. Haas. High moisture or canned-type animal foods can also be successfully treated according to the present invention. The disclosures relating to animal food formulations in the above mentioned patents are incorporated by reference.

The following examples are presented for the purpose of further illustrating and explaining the present invention and are not to be taken as limiting in any sense. Unless otherwise indicated, all parts and percentages are by weight.

Example I.

This example illustrates a preferred procedure for improving the palatability of an animal food by adding a lipolyzed fat according to the present invention. Twelve pounds of water at 100°F is added to 8 pounds of beef tallow at about 120°F. The mixture is then emulsified by adding about 0.066 pounds of Kelcoloid KDLVF propylene glycol alginate (low viscosity) emulsifier and emulsified in a homogenizer for five minutes. To the emulsion maintained at a temperature of 110°F is added about 0.044 pounds of "Takamine" Pancreatic lipase dissolved in water at about 100°F. The word "Takamine" is a registered Trade Mark . The emulsion is then re-emulsified for 5 minutes and then maintained at a temperature of 100°F for a period of 4 days. At the end of this incubation period, the lipolyzed fat is coated onto an animal food in an amount of 2% based on the weight of the total food. The food contained 9% moisture and was previously coated with 2% of untreated bleachable fancy tallow. The composition of the food on a dry basis was: 40.4% whole corn; 23.1% soya meal; 20.8% wheat middlings; 11.6% of meat meal; and 4.1% of a vitamin, mineral, dye and flavoring mix.

Example II.

This example illustrates another process according to the present invention for improving the palatability of dry animal food. About 120 g of an emulsifier comprising succinoylated monoglycerides is dispersed in 3.2 liters of an aqueous solution which is 0.0066 M with respect to $CaCl_2$ and 0.5 M with regard to NaCl. This mixture is brought to a boil with a steam coil and held at this temperature for about 10 minutes. The mixture is then cooled to 50°C and 800 grams of melted bleachable fancy tallow is then added. The mixture is then homogenized by mixing in a Waring blender at high speed for three minutes. To the homogenized mixture is added 8 grams of Miles Laboratories pancreatic lipase 250. The reaction mixture is incubated for about two hours. This emulsified, lipolyzed fat is sprayed onto a dry animal food, similar to that employed in Example I but containing 3% untreated bleachable fancy Tallow, to obtain a lipolyzed fat content of 1%.

Example III.

As a further example of a preferred process for preparing a highly palatable animal food according to the present invention, the procedure of Example II is repeated but this time employing sodium stearoyl-2-lactylate as the emulsifier in place of the succinoylated monogylcerides.

Example IV.

This example illustrates a preferred procedure for conditioning a fat-protein mixture according to the present invention. "Promine" D soy isolate (120 g), a proteinaceous emulsifier, was dispersed in 3.2 liters of an aqueous solution which was 0.0066 M with respect to $CaCl_2$ and 0.5M with regard to NaCl. This mixture was brought to a boil with a steam coil and held at this temperature for about 10 minutes. The mixture was then cooled to 50°C and the pH was adjusted to 8.0—8.5 and 800 grams of melted bleachable fancy tallow was added. The mixture was then homogenized by mixing in a Waring blender at high speed for three minutes. The pH was adjusted to the indicated range by the addition of sodium hydroxide when necessary. To the homogenized mixture was added 8 grams of pancreatic lipase 250, available from Miles Laboratories. The reaction mixture was incubated for about two hours while adjusting the pH to 8.0—8.5 every thirty minutes. At the conclusion of the conditioning reaction, the material was frozen.

Example V.

This example illustrates a preferred method according to the present invention for preparing an animal food of enhanced palatability. The frozen emulsion prepared in Example IV was thawed in warm water for application to an animal food. In those instances where a quantity of the emulsion broke upon thawing, it was re-emulsified by homogenizing in a Waring blender at high speed for about three minutes. This emulsion was applied to a commercially-available, granular, dry animal food having a coating amounting to 3% by weight of non-conditioned bleachable fancy tallow, a moisture content of 9% and having the following dry basis formulation: 40.4% corn; 23.1% soya meal; 20.8% wheat middings; 11.6% of 50% meat meal, and 4.1% vitamin, mineral, dye and flavoring mix. The emulsion contained about 20% of the enzyme-conditional fat-protein mixture and was sprayed onto the animal food by means of a spray gun into a cement mixer containing the dry food to give an enzyme-conditioned fat-protein mixture content of 1%. The animal food was then dried by heating for 5 to 10 minutes at 90°—

110°C to reduce the final moisture content of the animal food to about 8—12%.

Example VI.

This example illustrates the dramatic increase in palatability of animal foods which can be obtained according to the present invention. In each of the 21 runs listed in Tables I, II and III, a fat was emulsified and conditioned with an enzyme mixture comprising protease and lipase. The fats were conditioned according to the procedure of Example I while varying the particular fats and reaction conditions as indicated in the tables. Non-proteinaceous emulsifiers were employed in runs 6, 7 and 21. The enzyme-conditioned fat was heated to 95°C where indicated to inactivate the enzymes. The enzyme-conditioned fats were applied by spraying in the indicated amounts onto an animal food according to the procedure of Example V to give a total fat coating on the animal food of 4%. The remainder of this fat was unemulsified, unconditioned bleachable fancy tallow (BFT). Animal foods prepared in this manner are identified by the letter L under the headings Treatment, Type in the tables below.

For comparison, three other types of animal foods were prepared:

(1) type E, contained the same fat employed in the animal food identified by L in a given run. Here the fat was emulsified, but not conditioned with the enzyme mixture according to the present invention;

(2) type U, contained the same fat employed in type L in a given run; however, the fat was neither emulsified nor conditioned with the enzyme mixture; and

(3) as a base line control, in all of the runs except 4—8, 10 and 20 where the type U animal food was the control, an animal food containing the total 4% fat as a coating of unemulsified, unconditioned bleachable fancy tallow was employed.

According to this example, 40 dogs of mixed breed were fed the various foods as indicated in the tables and their relative preferences were recorded and objectively compared. The results of the test are expressed in terms of an average preference rating (APR). The APR values relate to comparison with a control and are defined as follows:

APR Rating	Response
2.0 or greater	Strong preference
0.80 to 1.99	Moderate preference
0.0 to 0.79	No preference
−0.00 to −0.79	No rejection
−0.8 to −1.99	Moderate rejection
−2.0 or less	Strong rejection

The results of these tests are summarized in Tables I, II and III. It will be noticed that Runs 2 and 3, which compare a type U fat to the base line control indicate a preference between two different lots of bleachable fancy tallow. This is explained by the fact that no two samples are exactly alike, but vary according to their preparation and storage histories.

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TABLE I

Run	Fat		Treatment					APR
	Type	wt %	Type	pH	Enzymes	Emulsifier	Post Heat	
1	BFT	1.0	L	8.0	P[a]	S[c]	no	1.18
	BFT	1.0	L	8.0	F[b]	S	no	0.65
2	BFT	1.0	L	8.0	P	S	no	1.89
	BFT	1.0	E	8.0	–	S	no	0.47
	BFT	1.0	U	8.0	–	–	no	-0.62
3	BFT	1.0	L	7.94	P	S	no	3.20
	BFT	1.0	L	4.0	P	S	no	2.10
	BFT	1.0	U	8.0	–	–	no	1.43
4	BFT	2.0	L	8.0	P	S	no	1.236
	BFT	2.0	E	8.0	–	S	no	1.88
	BFT	2.0	U	8.0	–	–	no	0
5	BFT	1.0	L	8.0	P	S	no	2.638
	BFT	1.0	E	8.0	–	S	no	2.027
	BFT	1.0	U	8.0	–	–	no	0
6	BFT	1.0	L	8.0	P	SSL[d]	no	0.486
	BFT	1.0	E	8.0	–	SSL	no	0.347
	BFT	1.0	U	8.0	–	–	no	0
7	BFT	1.0	L	8.0	P	SMG[e]	no	1.614
	BFT	1.0	E	8.0	–	SMG	no	-0.208
	BFT	1.0	U	8.0	–	–	no	0
8	BFT	1.0	L	8.0	P	S	yes	1.263
	BFT	1.0	L	8.0	P	S	no	0.944
	BFT	1.0	U	8.0	–	–	no	0

[a] pancratic lipase

[b] fungal lipase

[c] soy isolate proteinaceous emulsifier ("Promine" D)

[d] sodium stearoyl-2-lactylate

[e] succinoylated monglycerides (SMG)

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TABLE II

Run	Fat		Treatment			APR
	Type	wt %	Type	pH	Time (hrs)	
9	Butter oil	1.0	L	8.0–8.2	2	2.70
	Butter oil	1.0	U	8.0–8.2	2	2.29
10	Butter oil	1.0	L	8.0–8.2	2	2.38
	Butter oil	1.0	E	8.0–8.2	2	1.35
	Butter oil	1.0	U	8.0–8.2	2	0
11	Butter oil	1.0	L	8.0–8.2	2	0.27
	Butter oil	1.0	E	8.0–8.2	2	-0.08
	Butter oil	1.0	U	8.0–8.2	2	-0.27
12	Butter oil	1.0	L	8.0–8.2	2	-1.1
	Butter oil	1.0	E	8.0–8.2	2	1.1
	Butter oil	1.0	U	8.0–8.2	2	0.8
13	Butter oil	1.0	L	8.0–8.2	2	2.35
	Butter oil	1.0	E	8.0–8.2	2	2.30
14	Butter oil	0.5	L	8.0–8.2	2	2.20
	Butter oil	0.5	E	8.0–8.2	2	2.79
15	Butter oil	0.25	L	8.0–8.2	2	0.93
	Butter oil	0.25	E	8.0–8.2	2	0.27
16	Butter oil	0.10	L	8.0–8.2	2	1.21
	Butter oil	0.10	E	8.0–8.2	2	1.18
17	Butter oil	0.5	L	8.0–8.2	16	1.53
	Butter oil	0.5	E	8.0–8.2	16	1.75
18	Butter oil	1.0	L	8.0–8.2	2	2.15
	Butter oil	1.0	E	8.0–8.2	2	1.47
19	Butter oil	1.0	L	7.3	2	3.66
	Butter oil	1.0	L	4.0	2	2.72
	Butter oil	1.0	U	8.0	2	3.10

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TABLE III

Run	Fat		Treatment				APR
	Type	wt %	Type	pH	Emulsifier	Time (Hrs.)	
20	Chicken fat	1.0	L	8.0	S	2	2.18
	Chicken fat	1.0	L	8.0	S	4	1.77
	Chicken fat	1.0	E	8.0	S	0	1.62
	Chicken fat	1.0	U	8.0	–	–	0
21	Chicken fat	1.0	L	8.0	SMG	2	1.208
	Chicken fat	1.0	E	8.0	SMG	2	1.208

Example VII.

This example illustrates another preferred method according to the present invention for conditioning a fat-protein mixture according to the present invention. An admixture containing about 53.6% tripe, 15.8% trimmings, 3.9% defatted beef tissue, 1.7% lungs, 1.1% emulsifier, 12.9% propylene glycol, 6.4% corn syrup, and 4.6% water was pulverised in a homogenizer to obtain a meat slurry. Four hundred pounds of this meat slurry is brought to 50°C with efficient stirring. The pH is adjusted to 8.0—8.5 by the addition of 2N NaOH. Then, 0.36 pounds of Miles Laboratories pancreatic lipase 250, equivalent to 1% of the fat in the meat slurry, is added to the slurry. Constant efficient stirring is maintained for the 37 minute reaction period, during which the pH is monitored continuously. Each time the pH drops to 7.8, sufficient 2n NaOH is added to raise the pH to about 8.2. The pH is adjusted to 8.2 at the conclusion of the reaction, and the mixture is heated to 90°—95°C to inactivate all enzymes.

Example VIII.

This example illustrates another preferred method according to the present invention for preparing an animal food of enhanced palatability. Three separate portions enzyme-treated meat slurry prepared in Example VII are blended with additional amounts of the untreated meat slurry to obtain combined slurries containing 11.2%, 33.6% and 67.2% of the enzyme-treater slurry. Then, 44.6 parts of each of these combined slurries is admixed with 1.9 parts of soya hulls, 5.9 parts of a vitamin, mineral, flavoring and dix mix, 15.7 parts sucrose, and 31.9 parts of soya flakes. These admixtures are then extruded through a cooled extruder to form three animal foods: The first containing 5% of the enzyme-treated meat slurry; the second, 15% and the third 30%.

Example IX.

This example illustrates the improvement in palatability which can be obtained according to the present invention. The three animal foods prepared according to the procedure of Example V are tested and compared to an animal food identical in all respects, except containing no enzyme-treated fat-protein mixture as a control. Forty dogs of mixed breed were fed the four animal foods and their preferences recorded in terms of the APR as explained in Example VI. The results are shown below in Table IV.

TABLE IV

Run	% enzyme-treated meat slurry	APR
1	0	0
2	5	2.27
3	15	2.35
4	30	3.79

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WHAT WE CLAIM IS:—

1. A process for manufacturing an animal food which comprises subjecting a fat to the action of lipase, or a mixture of fat and protein to the action of lipase and protease and incorporating the conditioned fat or mixture of fat and protein into the animal food.

2. A process for manufacturing an animal food which comprises subjecting a fat to the action of lipase and incorporating the lipolyzed fat into the animal food.

3. A process for manufacturing an animal food which comprises conditioning a mixture comprising fat and protein by emulsifying the fat and treating the mixture with an enzyme mixture comprising lipase and protease and incorporating the enzyme conditioned fat-protein mixture into the animal food in an amount effective to increase the palatability of the food.

4. A process according to any one of claims 1 to 3, in which the fat or fat and protein are animal fat and protein.

5. A process according to any one of claims 1 to 4, wherein the lipase is pancreatic lipase.

6. A process according to any one of claims 1, 2, 4 or 5, in which the fat is emulsified.

7. A process according to any one of claims 1, 2 and 4 to 6, wherein the fat is heated to a temperature of from 100° to 140°F. admixed with an aqueous solution containing emulsifier which is vigorously mixed to emulsify, the lipase is mixed with the emulsion and the resultant emulsion maintained at from 100° to 140°F. for from 5 minutes to 96 hours.

8. A process according to any one of claims 1 to 7, wherein the fat to water ratio is from 1:4 to 1:1 and the lipase is employed in an amount of from 0.1 to 1% by weight based on weight of fat.

9. A process according to any one of claims 1, and 3 to 8, wherein the protein contains a proteinaceous emulsifier.

10. A process according to any one of claims 1, and 3 to 9, wherein the lipase is employed in an amount of from 20 to 250 lipase units per 100 grams of mixture comprising fat and protein and the protease is employed in an amount of from 5000 to 7000 protease units per 100 grams of mixture comprising fat and protein.

11. A process according to any one of claims 1, and 3 to 10, wherein the conditioning is carried out on animal food containing protein *in situ*.

12. A process according to any one of claims 1, and 3 to 10, wherein the fat is melted at from 35 to 50°C. emulsified in an aqueous solution containing a proteinaceous emulsifier, enzyme mixture is added to the emulsion and the emulsion is maintained with stirring at a pH of from 7 to 9 and at from 35° to 50°C. for from 5 minutes to 16 hours.

13. A process according to claim 12, wherein the fat to water ratio is from 1:4 to 1:1.

14. A process according to any one of claims 1 to 13, wherein a promoter is employed in the conditioning step.

15. A process according to any one of claims 1, 3 to 10 or 12 to 14, wherein the enzyme conditioned fat protein mixture is prepared separately and incorporated into an animal food.

16. A process according to any one of claims 1, or 3 to 10, or 12 to 14, wherein the enzyme conditioned fat or enzyme conditioned fat protein mixture is coated onto the animal food.

17. A process according to claim 16, wherein the enzyme conditioned fat or fat protein mixture is sprayed onto an animal food as an emulsion in a fat to water ratio of from 1:5 to 1:1.

18. A process according to claim 17, wherein the emulsion of conditioned fat is frozen and thawed before application to the food.

19. A process according to any one of claims 1, or 2 to 18, wherein the fat protein mixture is employed of from 5% to 30% based on the weight of animal food.

20. A process for manufacturing an animal food according to claim 2 and substantially as hereinbefore specifically described in Examples 1 to 3.

21. A process for manufacturing an animal food according to claim 3 and substantially as hereinbefore specifically described in Examples 4 to 9.

22. An animal food when prepared by a process as described in any one of claims 1 to 21.

23. An animal food with enhanced palatability comprising an effective amount of a lipolyzed fat or fat and protein subjected to lipase and protease.

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